PROTOFILWW: INSIGHTS IN THE ECOLOGY OF ACTIVATED-SLUDGE SYSTEMS

Ana Nicolau, Marta Neto, Liliana Santos, Nelson Lima e Manuel Mota
IBB-Institute for Biotechnology and Bioengineering, Centre of Biological Engineering, Universidade do Minho, Campus de Gualtar, 4710-057 Braga, Portugal.

Treatment of wastewater by activated sludge processes represents a component of the largest biotechnology in the world. Yet activated sludge systems correspond to microbial ecosystems complex enough to discourage most microbial ecologists. The importance and the role of the protozoa and little metazoa community in the purification process of activated-sludge plants are well established. Even though, very few studies have established reliable relationships between the microfauna and the operational conditions or physical-chemical parameters [1,2]. Another component that deserves particular interest by managers and technicians is the excessive growth of filamentous bacteria, causing the known phenomena of bulking and foaming.

The present investigation being carried on aims at the identification of the microfauna (protozoa plus small metazoa) and filamentous bacteria on a wide set of activated-sludge wastewater treatment plants (WWTP), working on different regions of Portugal, under different operational and physical-chemical conditions in order to allow for the establishment of consistent relationships between the former and the latter.

Each of the WWTP will be studied several times allowing for the identification of the causes and for the answer of questions such as Why do different filamentous or microfauna species appear in similar conditions? Do the WWTP tend to maintain the same populations or do these changes often? Are the changes cyclic or occasional?

One of the most important objectives of the present proposal is the implementation of molecular techniques to allow for the confirmation of the identifications of the filamentous bacteria: the identification by morphological features can be problematic and erroneous.

[1] Nicolau A, Mota M and Lima N, "Protists as indicators of toxicants entrance in activated sludge processes", *Environmental Engineering Science* (2007), **24**: 434-445.
[2] Nicolau A, Dias N and Lima N, "Ciliated protists as test organisms". *In* Jay H. Lehr e Jack Keeley, Janet Lehr & Thomas B. Kingery (Eds) *Encyclopedia of Water: Water Quality and Resource Development*, John Wiley and Sons, Inc. (2005): 413 – 418.